CLAIMS

1. A method for diagnosing functional faults of an assembly of electronic systems, the said systems being composed of components (A^n_i; C^n_i; UCE_n; B) that produce and consume data, at least one of the said data (x_i) being able to assume a predetermined particular value (x_{ip}), such as, for example, a fault indication stored in a memory of a calculator, following the development of a functional fault of at least one of the components (A^n_i; C^n_i; UCE_n; B) of the said assembly, this method being characterized in that:

i) during a phase of design of the architecture of the said assembly of systems, the particular values are classified (a) according to the associated types of faults, and the said classification is recorded in a computer memory, for example in the form of a lookup table;

ii) during a diagnostic phase, a diagnostic tool is connected to the said assembly of electronic systems, the said tool having access to the said classification;

iii) the particular values corresponding to types of faults of components predefined in the said classification as particularly reliable are suppressed (b);

iv) the data (x_i) that have assumed a particular value (x_{ip}) are selected (c);

v) for each datum (x_i) selected in step (iv), there is automatically calculated (d) a group ($X\infty_i$) of data capable of being responsible for the particular values (x_{ip}) assumed by the datum (x_i);

vi) there is automatically established (e) a list ($X\infty$) of the data contained in the intersection of the said groups ($X\infty_i$) of data, and

vii) a step of recording of the particular values and their propagation on a memory means for a tool provided for the diagnosis of the said assembly of electronic systems.

2. A method according to claim 1, characterized in that the faults for which consequences have not been observed are excluded (g) from the said list (X∞).

3. A method according to claim 1 or 2, characterized in that, if no fault remains in step (vi), it is restarted at step (ii), by taking into account (j) classes of fault that had been removed previously.

4. A method according to claim 3, characterized in that, if a fault remains in step (vi), it is verified that one of the faults identified in phase (g) is indeed the cause of the problem that led to initiation of the said diagnostic phase and, if such is not the case, step h) is recommenced.

5. A method according to any one of claims 1 to 4, characterized in that the said list (X∞) is analyzed to identify that component or those components of the assembly in which a functional fault is responsible for the particular values (x_{ip}) assumed by the said data (x_i).

6. A method according to any one of claims 1 to 5, characterized in that fault types belong to at least one of the categories listed below:

- the values created following the unavailability of a datum emitted by a function,

- the particular values created following the detection of a fault of a sensor or actuator,
- the particular values created following a fault of the connection system, at the level of a connector or wire,
- the particular values created following a fault of a calculator,
- the particular values created following a fault of execution of a program on a microcontroller, and
- the particular values created following a fault at the level of a communication network.

7. A diagnostic method according to any one of claims 1 to 6, characterized in that there is automatically determined a probability that each datum will assume a particular value as a function of the category to which it belongs, and in that step (b) is modified by first taking step (j) into account.

8. A diagnostic method according to any one of claims 1 to 7, characterized in that the said assembly of electronic systems is composed of an assembly of systems for equipping a vehicle.

9. A diagnostic method according to any one of claims 1 to 8, characterized in that it includes a step of analysis of the feasibility and/or susceptibility to failure of the said assembly of electronic systems and of the establishment of an output indicating the said feasibility and/or susceptibility to failure.

10. A commercial article provided with a computer-readable memory, a program executable by a computer being recorded in the said memory for the diagnosis of functional faults of an assembly of electronic systems, characterized in that the said program includes encoding for:

i) classifying (a), during a phase of design of the architecture of the said assembly of systems, the particular values according to the associated types of faults, and the said classification is recorded in a computer memory, for example in the form of a lookup table;

ii) connecting, during a diagnostic phase, a diagnostic tool to the said assembly of electronic systems, the said tool having access to the said classification;

iii) suppressing (b) the particular values corresponding to types of faults of components predefined in the said classification as particularly reliable;

iv) selecting (c) the data (x_i) that have assumed a particular value (x_{ip});

v) automatically calculating (d), for each datum (x_i) selected in step (iv), a group ($X\infty_i$) of data capable of being responsible for the particular values (x_{ip}) assumed by the datum (x_i);

vi) automatically establishing (e) a list ($X\infty$) of the data contained in the intersection of the said groups ($X\infty_i$) of data, and

vii) recording the particular values and their propagation on a memory means for a tool provided for the diagnosis of the said assembly of electronic systems.

11. A data-processing tool programmed for the diagnosis of an assembly of electronic systems using the steps of the method according to any one of claims 1 to 9 or programmed by using a commercial article according to claim 10.